would, in general, be the same as the corresponding ratio of the visual brightness. When the question is no longer to determine the brightness of such a group of stars, but to establish a system of magnitudes for stars all over the heavens, I think it, if not necessary, at least desirable to do this to a certain degree independently of all visual evaluations of the magnitude. I use the expression "to a certain degree," meaning that the light ratio employed in determining the system of photographic magnitudes ought to be the same as that employed in visual photometry. From this point of view, I think that a combination of the methods employed by Mr. SCHAEBERLE and by myself will perhaps be sufficient to establish an absolute system of photographic magnitudes. With the method of Mr. SCHAEBERLE, which of course is somewhat troublesome to use in extensive series of observations, a sufficient number of "standard stars" is first to be determined. The remaining stars will then be very easily determined by the formula which I have proposed, having fixed for each plate the values of the constants a and b with the aid of the above-named standard stars.

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C. V. L. CHARLIER.

OBSERVATORY OF UPSALA, April 6, 1891.

Note on the above Letter.

With reference to the above letter from Dr. CHARLIER, I desire to make a few remarks.

I entirely agree with Dr. CHARLIER that the comparison given above shows that the formula to be employed in the reduction of the photographs must be that one which is deduced from the results obtained with the particular instrument and plate employed in the photographic work.

In my paper, referred to by Dr. CHARLIER, I expressly stated that the final equation represented the observed diameters on a No. 26 SEED plate in the focus of the particular telescope used.

With reference to the statement "The application of (1) for the determination of stellar magnitudes requires us to assume that the brightness of the image in the focus of an objective is proportional to the free aperture of the objective," I wish to say that while the remarks made on page 57 of my paper would naturally lead to such a conclusion, still such is not necessarily the case as I shall now attempt to show.

In deducing the fundamental formula the factors for any particular case are so determined that an observed diameter representing a given magnitude is best represented for any one of the three following conditions:

(1) Constant aperture with varying time.
(2) Varying aperture with constant time.
(3) Both aperture and time varying.

In other words no assumption is made, the relation between time and aperture as expressed by the equation being such that each observed diameter represents the same magnitude for any given star. This same relation is then used to find the theoretical aperture which is required to produce a given brightness or magnitude, from the data obtained with a constant aperture; the resulting areas of the objective are not necessarily proportional to the corresponding resulting brightness. The area of the aperture is a function of the brightness in the stellar focus, but it is not necessarily a direct measure of the same.

In an extensive series of observations the work required to obtain the desired results will in the end be practically independent of the form of the original equation, since such results will naturally be taken directly from the tables, which, when once computed for a given instrument and plate, will require the same labor in using, whatever the form of the original equation may be.

From a note in the 1891 May No. of the *Monthly Notices of the Royal Astronomical Society*, it appears that several years ago Professor PRITCHARD obtained an expression for the diameter of the photographic image of a star, in which the logarithm of the time entered as a factor. I have not yet had an opportunity of seeing the original paper which is not in the library of the Lick Observatory.

With reference to Dr. CHARLIER'S remarks on the development of the plates, I can add that it appears from an investigation "On atmospheric absorption" now nearly completed, that the differences between two plates taken from the same box is sometimes so great that should the same constants be used in the reductions for the two plates, the resulting brightness of a given star on one plate would occasionally be as much as twice as great as on the other plate exposed under the same conditions. The necessity for having an impression of a standard star on each plate is, therefore, apparent.

It is safe to say that the law of variation in the diameter of the image of a star with varying times of exposure must be tested for each instrument used, since no two telescopes will ever have exactly the same form of focal image.

A uniformity in the kind of plate used is of course indispensible if a direct comparison is a desideratum.

J. M. SCHAEBERLE.

MT. HAMILTON, July 27, 1891.

ERRATA IN THE SECOND ARMAGH CATALOGUE OF STARS.

Communicated by Dr. J. L. E. DREYER, Director of the Armagh Observatory.

No. 178, *for* $10^s.61$ *read* $9^s.61$.

No. 770, *for* $9^s.88$ *read* $11^s.34$.

No. 1083, *for* $27^s.25$ *read* $28^s.25$.

No. 1102, *for* $32^s.62$ *read* $33^s.24$.

No. 1138, *dele* seconds of R. A., "Epoch" and "Obs." The star was not observed in R. A.

No. 1138, in N. P. D. *for* 48′ *read* 47′.

No. 1531, in N. P. D. *for* 6′ *read* 5′.

Page 152. No. 1055 is ARG. XXXIII, the P. M. is according to ARGELANDER $-0^s.0141$, $+0''.100$.

Page 158. First column, *for* 1035 *read* 1435.

FOREST FIRES AT MOUNT HAMILTON, JULY, 1891.

[The following report to the Regents of the University of California may have some interest to others as a part of the history of the Lick Observatory.]

MOUNT HAMILTON, July 29, 1891.

HON. T. G. PHELPS, *Chairman L. O. Committee:*

DEAR SIR,—I beg to submit the following report on the forest fires of July 21 to July 28. I have asked Professor SCHAEBERLE to write this, as he was in charge of the Observatory for most of the time—but he prefers that I should give you this account.

The Observatory is at the summit of a rocky peak called Mt. Hamilton. Just north of it is a deep wide thickly wooded cañon—*Cañon Negro*—and the mountain *Galileo* is on the other side of this cañon, about 4500 feet distant. The whole object was to keep the fire from reaching the chapparal in this cañon. It could enter in two ways; either by passing down the cañon north of *Galileo* (in which the *Joaquin Spring* is situated) and down the cañon of